

What Is Claimed Is:

1. A moldable heat shield comprising a nonwoven composite of a core layer and outer shell layers adjoining the core layer, the core layer having entangled staple core fibers, the entangled core fibers comprising a blend of thermoplastic fibers and lower melting thermoplastic fibers, and the shell layers having entangled shell fibers, the entangled shell fibers comprising a blend of partially oxidized polyacrylonitrile staple fibers and thermoplastic staple fibers.
2. The moldable heat shield according to Claim 1, wherein the core layer has an entanglement zone, within which shell fibers from the shell are entangled with core fibers from the core.
3. The moldable heat shield according to Claim 1, wherein the thermoplastic staple fibers of the shell comprise polyester staple fibers.
4. The moldable heat shield according to Claim 1, wherein the core fibers comprise polyester staple fibers.
5. The moldable heat shield according to Claim 1, wherein the low melt core fibers comprise low melt polyester staple fibers.
6. The moldable heat shield according to Claim 1, wherein the core fibers comprise hollow-fill fibers.
7. A moldable heat shield comprising a nonwoven composite of a core layer and outer shell layers adjoining the core layer, the core layer having entangled staple core fibers, the entangled core fibers comprising a blend of thermoplastic fibers and lower melting thermoplastic fibers, and the shell layers having entangled shell fibers, the entangled shell fibers comprising a blend of partially oxidized polyacrylonitrile staple fibers, thermoplastic staple fibers, and a lower melting thermoplastic staple fibers.

8. The moldable heat shield according to Claim 7, wherein the core layer has an entanglement zone, within which shell fibers from the shell are entangled with core fibers from the core.
- 5 9. The moldable heat shield according to Claim 7, wherein the thermoplastic staple fibers of the shell comprise polyester staple fibers.
- 10 10. The moldable heat shield according to Claim 7, wherein the low melt thermoplastic staple fibers of the shell comprise low melt polyester staple fibers.
11. The moldable heat shield according to Claim 7, wherein the core fibers comprise polyester staple fibers.
12. The moldable heat shield according to Claim 7, wherein the low melt core fibers comprise low melt polyester staple fibers.
13. The moldable heat shield according to Claim 7, wherein the core fibers comprise hollow-fill fibers.
- 15 14. The moldable heat shield according to Claim 7, wherein the outer shell layers have an outer surface of fused shell fibers.
- 20 15. A method of forming a moldable heat shield comprising the steps of:
- a) forming a first shell nonwoven mat by needling together a blend of partially oxidized polyacrylonitrile staple fibers and thermoplastic staple fibers;
- 25 b) forming a second shell nonwoven mat by needling together a blend of partially oxidized polyacrylonitrile staple fibers and thermoplastic staple fibers;
- c) forming a core nonwoven mat by needling together low melt temperature thermoplastic staple fibers;
- d) disposing the first shell nonwoven mat and the second shell nonwoven mat onto opposite surfaces of the core nonwoven mat;

- 5 e) needling the first shell nonwoven mat onto the core mat such that the barbs of the needles pass through the first shell nonwoven mat and do not pass through the second shell nonwoven mat; and,
- f) needling the first shell nonwoven mat onto the core mat such that the barbs of the needles pass through the first shell nonwoven mat and do not pass through the second shell nonwoven mat.
16. The method according to Claim 15, wherein the thermoplastic staple fibers of the first nonwoven shell mat comprise a low melt temperature thermoplastic staple fiber.
- 10 17. The method according to Claim 16, further including the step of calendaring the outer surface of the first nonwoven shell mat prior to the step of disposing the first nonwoven shell mat onto the core mat.
- 15 18. The method according to Claim 17, wherein the thermoplastic staple fibers of the second nonwoven shell mat comprise a low melt temperature thermoplastic staple fiber.
19. The method according to Claim 18, further including the step of calendaring the outer surface of the second nonwoven shell mat prior to the step of disposing the second nonwoven shell mat onto the core mat.
- 20 20. A method of forming a moldable heat shield comprising the steps of:
- a) forming a first shell nonwoven mat by needling together a blend of partially oxidized polyacrylonitrile staple fibers and thermoplastic staple fibers;
- 25 b) forming a second shell nonwoven mat by needling together a blend of partially oxidized polyacrylonitrile staple fibers and thermoplastic staple fibers;
- c) forming a core nonwoven mat by needling together low melt temperature thermoplastic staple fibers;

- d) positioning the shell nonwoven mats adjacent to the outer surfaces of the core nonwoven mat with an adhesive material disposed between the core nonwoven mat and each shell nonwoven mat.
- e) heating the collective shell nonwoven mats, core nonwoven mat, and adhesive to a temperature which activates the adhesive.

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